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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of: Emi TAKUMA)	Group Art Unit: 2855
)	
Serial No.: 10/659,269)	Examiner: M. Noori
)	
Filed: September 11, 2003)	Confirmation No.: 3525
)	
For: MAGNETIC STEERING ANGLE)	
DETECTION APPARATUS)	
)	

**Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450**

Sir:

REQUEST FOR RECONSIDERATION

In reply to the Final Office Action mailed April 14, 2005, Applicant requests reconsideration of the above-identified application pursuant to the following arguments and remarks.

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REMARKS/ARGUMENTS

The Final Office Action mailed April 14, 2005 contained rejections under 35 U.S.C. 103(a) of all of claims 1-6 now pending in this application. Herewith, Applicants offer no further amendment to the claims. Instead, Applicants offer the following remarks and arguments in favor of patentability of claims 1-6.

Interview Summary

Applicants acknowledge with appreciation the telephone interview graciously granted Applicants' undersigned representative on July 12, 2005 by the Primary Examiner now charged with examination of this application, Mr. Max Noori. During the interview, Applicants' representative first summarized Applicants' invention, explained his understanding of the three prior art references applied against the claims, and highlighted the shortcomings of the rejections of record. Then, Applicants' representative explained the manner in which the presently pending claims set forth a combination of elements neither disclosed by nor made obvious by any one of the three applied references or any logical combination of the three applied references.

Upon ensuing discussion and consideration of the points made by Applicants' representative, Examiner Noori expressed that he concurred in the conclusion that the rejections present in the Final Office Action were not sustainable. However, Examiner Noori noted that he did not personally conduct the search that revealed the prior art now of record, and that he deemed it necessary to give the matter further search before making a decision on patentability.

Examiner Noori suggested the possibility of filing a Request for Continued Examination (RCE), and Applicants' representative acknowledged that this was an option. However, Applicants' representative explained that since the rejections contained in the Final Office Action were not sustainable, and because the claims properly define Applicants' contribution without the necessity for amendment, Applicants would likely file a substantive response to the Final Office Action and fairly expect a new Office Action with a proper opportunity to respond in the event better prior art is discovered.

The interview then terminated. Applicants now offer the following arguments and remarks, made in part during the interview, in support of patentability of the claims.

Rejection of Claims 1, 3, and 5

Claims 1, 3, and 5 have been rejected under 35 U.S.C. 103(a) as unpatentable over Zabler, et al. (U.S. Patent No. 5,930,905) (hereafter Zabler) in view of Niki, et al. (U.S. Patent No. 6,404,084) (hereafter Niki).

Applicants' invention relates to a magnetic steering angle detection apparatus. The apparatus comprises, *inter alia*, a magnet and a sensor. During steering, the sensor and the magnet experience relative movement. It is through this relative movement that a detection of the steering angle and subsequent calculation of that angle are effectuated. The problem to be solved, and which the present invention does in fact solve, is the prevention of outside interference with the sensor by magnets other than the magnet that comprises a part of the apparatus. For example, magnets that the operator of a vehicle might carry into the vehicle and place in close proximity to the

steering column, such as one on the ignition key chain, can be sensed by the conventional steering angle detection apparatus and lead to inaccurate results. The prior art solution has been the provision of shielding structure to prevent the magnetic interference. The present invention prevents the interference without shielding and yields a more direct and less expensive solution.

In essence, the solution that Applicants have developed is to so dispose each magnetic sensor such that its sensing direction is substantially a single direction coinciding with the axial direction of the steering shaft. This structural arrangement is clearly disclosed in Applicants' specification and drawings and is expressed definitely and unequivocally in the last clause of each of independent claims 1 and 2. This solution is clearly not recognized in the prior art applied against the claims.

Zabler discloses a steering angle sensor. The reference discloses the use of a main gear concentric to the steering shaft along with two smaller gears of unequal diameter. The two smaller gears have attached magnets and adjacent anisotropic magneto-resistive (AMR) sensors. The disclosure does mention in passing that Hall sensors may be used instead. Notably, there is no mention at all in Zabler of the sensing direction of the sensors. Accordingly, Zabler fails to disclose or suggest sensing in substantially a single direction coinciding with the axial direction of the steering shaft.

Niki relates to a vehicle window or sunroof control. Where an obstruction is caught in a closing vehicle window or sunroof, it is conventional to provide a sensor to prevent damage or injury to the obstruction (such as a child's hand). Conventionally, the sensor is on the motor armature. Because of a damper conventionally present in

the reduction drive train between the motor and the output shaft, an obstruction caught in the window or sunroof is not sensed immediately. The invention in Niki is to connect a speed increasing transmission to the output shaft and on the final rotor, increased in speed to be commensurate with the motor speed, situate a magnet and adjacent sensor to detect an obstruction directly and immediately.

Niki is not analogous art even though the apparatus contains, as one of its elements, a sensor for detecting rotation. Niki is not even remotely concerned with either steering angle sensors or prevention of magnetic interference. Under the legal test for analogous art set forth at MPEP 2141.01(a), Niki is neither in the field of Applicants' endeavor nor reasonably pertinent to the particular problem with which the Applicants were concerned. One skilled in the art would not reasonably be expected to look to window and sunroof drives to solve the problem of interfering magnetic fields in a steering rotation sensor.

Based on this discussion of Zabler and Niki, it is plain that neither reference contains any suggestion of the problem of preventing outside magnetic interference with the sensor or the solution of disposing the sensor such that a sensing direction thereof is set to be in a substantially single direction coinciding with the axial direction of the steering shaft. Even if these two references were to somehow be combined, the result would not be that which is set forth in claims 1, 3, and 5. It is only from Applicants' disclosure that one skilled in the art could find the suggestion to dispose the sensor such that a sensing direction thereof is set to be in a substantially single direction coinciding with the axial direction of the steering shaft in Zabler. Accordingly, the rejection is not sustainable and claims 1, 3, and 5 should be allowed.

Rejections of Claims 2-4 and 6

Claims 2-4 and 6 are rejected under 35 U.S.C. 103(a) as unpatentable over Zabler in view of Wan, et al. (U.S. Patent No. 6,707,293) (hereafter Wan) and Niki.

The Zabler and Niki references are discussed above in connection with the rejection of claims 1, 3, and 5. Here, the rejection of claims 2-4 and 6 relies further on the Wan patent.

One example of a rotary sensing arrangement in Wan is for use with a steering wheel column to sense the rotary position. Wan uses both a magnetoresistive (MR) sensor and a Hall sensor. The Hall sensor detects polarity and the MR sensor measures angular position of the magnetic field. Wan states that the magnetic field may be measured substantially in the direction perpendicular to the axis of rotation of the rotating shaft and that the Hall sensor may be mounted substantially along the axis of rotation. There is no suggestion of the measuring direction of the sensor being disposed such that a sensing direction thereof is in a substantially single direction coinciding with the axial direction of the steering shaft.

Based on this discussion of Wan, and the preceding discussion of Zabler and Niki, it is plain that none of these references contains any suggestion of the problem of preventing outside magnetic interference with the sensor or the solution of disposing the sensor such that a sensing direction thereof is set to be in a substantially single direction coinciding with the axial direction of the steering shaft. Accordingly, like the rejection of claims 1, 3, and 5, the rejection of claims 2-4 and 6 is not sustainable and claims 2-4 and 6 should be allowed along with claims 1, 3, and 5.

Applicants understand from the exchange between Applicants' undersigned representative and Examiner Noori during the interview that Examiner Noori may deem it necessary to give further scrutiny to the prior art. Once Examiner Noori has had the opportunity to consider this response and conduct further search as he deems appropriate, Applicants respectfully request that Examiner Noori telephone Applicants' representative at 571.203.2757 to apprise him of the next action to be taken in this application.

In view of the foregoing amendments and remarks, Applicants respectfully request reconsideration and reexamination of this application and the timely allowance of pending claims 1-6.

Please grant any extensions of time required to enter this response and charge any additional required fees to our deposit account 06-0916.

Respectfully submitted,

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Dated: July 14, 2005

By: 

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